

WHAT IS CLAIMED IS:

1. A nonvolatile memory comprising memory cells each of which comprises a storage element including a bistable molecular layer,

5 wherein the bistable molecular layer contains a bistable molecule which brings about isomerization from a first isomer into a second isomer by injecting a hole and an electron into the bistable molecular layer, and brings about isomerization from the second isomer into
10 the first isomer by irradiating the bistable molecular layer with erase light, and

 the memory is configured to irradiate the bistable molecular layers of all the memory cells with the erase light while applying an electric field to the bistable
15 molecular layer of only a part of the memory cells that stores information to be held when erasing information stored in the rest of the memory cells.

 2. The memory according to claim 1, wherein the storage element further includes a first electrode
20 facing one main surface of the bistable molecular layer and a second electrode facing the other main surface of the bistable molecular layer.

 3. The memory according to claim 2, wherein the storage element further includes a hole injection layer
25 between the first electrode and the bistable molecular layer.

 4. The memory according to claim 2, wherein the

storage element further includes an electron injection layer between the second electrode and the bistable molecular layer.

5 5. The memory according to claim 2, wherein the first electrode is larger in work function than the second electrode, and

the memory is configured to form the electric field by applying a first voltage between the first and second electrodes such that the second electrode has
10 a higher potential than that of the first electrode.

6. The memory according to claim 5, wherein the memory is configured to inject a hole and an electron into the bistable molecular layer from the first and second electrodes, respectively, by applying a second
15 voltage whose polarity is opposite to that of the first voltage between the first and second electrodes of one of the memory cells when writing information "0" or "1" into the memory cell.

7. The memory according to claim 6, wherein
20 the memory is configured to detect a current flowing through the storage element of one of the memory cells while applying a third voltage which has the same polarity as that of the second voltage and is smaller than the second voltage between the first and second
25 electrodes of the memory cell when reading out information stored in the memory cell.

8. A method of erasing information written in

a nonvolatile memory, the nonvolatile memory comprising memory cells each of which comprises a storage element including a bistable molecular layer, the bistable molecular layer containing a bistable molecule which
5 brings about isomerization from a first isomer into a second isomer by injecting a hole and an electron into the bistable molecular layer, and brings about isomerization from the second isomer into the first isomer by irradiating the bistable molecular layer with
10 erase light, comprising:

irradiating the bistable molecular layers of all the memory cells with the erase light while applying an electric field to the bistable molecular layer of a part of the memory cells to erase information stored
15 in the rest of the memory cells without erasing information stored in the part of the memory cells.

9. The method according to claim 8, wherein the storage element further includes a first electrode facing one main surface of the bistable molecular layer
20 and a second electrode facing the other main surface of the bistable molecular layer,

the first electrode is larger in work function than the second electrode, and

the electric field is formed by applying a voltage
25 between the first and second electrodes such that the second electrode has a higher potential than that of the first electrode.